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GENERAL REQUIREMENTS FOR INSULATED AIR CARGO CONTAINERS

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GENERAL REQUIREMENTS FOR INSULATED AIR CARGO CONTAINERS

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Assistant Director (MCPD), ISI

(*Continued on page* 2)

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*Shri K. N. S. Krishnan was the Chairman for the meeting in which this standard was finalized.

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(*Continued from page* 1)

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Indian Standard

GENERAL REQUIREMENTS FOR INSULATED AIR CARGO CONTAINERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 June 1982, after the draft finalized by the Air Cargo Handling Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 Perishable cargoes, for example dairy produce, fruit, vegetables, flowers, frozen foods, meat, fish, etc, require specific temperature ranges during door-to-door transportation. During this period of door-to-door transportation the container may be subjected to extreme external ambient temperatures from 50° to – 50°C and relative humidity up to 100 percent. This standard has been prepared to ensure that these cargoes are kept in prime condition during handling and air transportation.

0.3 In preparation of this standard considerable assistance has been drawn from draft standard ISO/TC 20/N.113 'Insulated air cargo containers' issued by the International Organization for Standardization.

1. SCOPE

1.1 This standard establishes minimum operational requirements to ensure that perishable cargoes in insulated standard airborne containers are kept in prime condition during ground handling and air transportation cycle with a maximum time span of 36 hours.

1.2 This standard refers to the thermal efficiency of all insulated air cargo containers irrespective of their size and designation.

1.3 This standard does not give the detail regarding refrigerated or heated containers and the methods and equipment to achieve these objectives.

2. DESIGN REQUIREMENTS

2.1 The minimum temperature variation for which the container shall be designed shall be 35°C.

2.2 The containers shall be free of sharp corners and/or crevices which may collect dirt and spillage. No pockets shall exist in the cargo loading space that cannot be reached by conventional cleaning methods.

2.3 Container may collect spillage during transport cycle but shall allow water run-off during flushing and/or washing. Adequate provision shall be made to ensure that cleaning shall be satisfactorily drained from inside of the container.

2.4 Materials used on container structure, interior surfaces, and insulation shall not absorb moisture or odour and shall not be functionally affected by daily washing.

2.4.1 Methods of washing shall include flushing using a pressure hose at 70°C and strong detergents.

2.4.2 Container when washed shall not require the use of odour neutralizing chemicals.

2.4.3 Container shall withstand freezing temperature while wet immediately following washing. All valves, seals, doors, and controls shall remain operative.

3. PRESSURIZATION

3.1 General — Containers will be closed at differing terminal altitudes, and the critical condition will be at sea level. Operationally the container may be subjected to either internal positive or negative pressure. Careful attention to the design of equalization devices, if any and, all seals is important in control of air leakage or heat transfer.

3.2 Pressure Equalization

3.2.1 Pressure relief device(s) which meets the airworthiness requirements for sudden decompression of aircraft cabin shall be provided.

3.2.2 A valve or similar device shall operate at a positive internal pressure differential not exceeding 3·5 kPa gauge.

3.2.3 If door seals do not provide sufficient leakage to enable negative internal pressures to be equalized in reasonable time, two way device shall be provided.

4. AIRTIGHTNESS TESTS

4.1 Airtightness tests shall be carried out independently of any structural tests as structural testing of a container may distort the structure in the seal areas of a container.

4.2 The temperature inside and outside the container shall be stabilized within 3°C of each other and shall both be within the range of 15° to 25°C.

4.3 The container shall be empty and in its normal operational condition with the access doors closed in normal manner. Any drain openings shall be closed.

4.4 Air shall be introduced through an accurate metering device and a suitable manometer shall be connected to the container by a leakproof connection. The manometer shall not be a part of air-supply system. The flow measuring device shall be accurate to ±3 percent of the measured flow rate and the manometer shall be accurate to ±5 percent.

4.5 Air shall be admitted to the container to raise internal pressure to 20 ± 1 mm water gauge and supply regulated to maintain this pressure.

4.6 The air leakage rate shall not be more than 50 percent of the air volume per hour.

NOTE — Higher leak rates up to 3 times the above value may be acceptable provided that allowance is made for this excess leakage rate in thermal tests (*see* **5.4**).

4.7 The air pressure shall be increased to 3·5 kPa gauge internal pressure. The pressure relief device or door seal expulsion shall operate.

4.8 On completion of the above tests there shall be no permanent deformation and the container shall be fully operational. Closure, seals and pressure equalization device shall be intact and functional.

5. THERMAL TEST

5.1 General — This test is performed to establish the overall heat transfer rate or '*K*' factor of the container. The container shall be tested in the exact configuration intended for use. Any options or component configuration alternatives shall be tested in a separate list and appropriately specified when applicable, in the container performance data.

5.2 Tests shall be carried out with an ambient temperature of 15°C and a temperature differential between the interior of container and ambient of 15° to 20°C. Temperatures shall be stabilized by soaking the unit at constant temperature for 2 hours before commencement of tests.

5.3 The '*K*' factor shall be expressed in watts.

5.4 Allowance shall be made for the heat transfer due to leakage as measured in **4.6**.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2